

A REVIEW OF PHOLCID SPIDERS FROM TIBET, CHINA (ARANEAE, PHOLCIDAE)

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ABSTRACT. The pholcid spiders from Tibet, China, are reviewed. Seven species belonging to three genera are recorded. A new genus, *Tibetia*, is established, and four new species, *Pholcus medog*, *P. zham*, *Belisana gyirong* and *B. mainling* are described. And two new combinations are formed: *Tibetia everesti* (Hu & Li 1987) is transferred from *Pholcus*, and *Belisana yadongensis* (Hu 1985) is transferred from *Spermophora*.

Keywords: Taxonomy, new species, new combination, Asia

The spider family Pholcidae currently contains 75 genera and 868 species (Platnick 2004) throughout the world. Members of the family vary in habitus, size and life style. Also, the pholcids are among the most common spiders occurring in houses. These spiders have elongate or globose abdomens and frequently very long and thin legs (about 4–20 times as their body length) with false segments in tarsi, and are thus called daddy-long-legs, although in a few pholcid species, the legs are quite short (only about 1 mm). The overall coloration of pholcids is quite variable, but the legs are often characteristically annulated. The eye region is more or less elevated, bearing eight or six eyes. If the smallest AMEs are present, the others are in two triads. The presence of the cheliceral stridulatory organs is variable. The male chelicerae are frequently equipped with pairs of special apophyses which are often species-specific in morphology and the pedipalps are conspicuously large and strong (Huber 1995, 1999) and their complex morphology has been well demonstrated by Uhl et al. (1995). Externally the female genitalia are usually relatively simple, but the internal morphology is very complicated (Huber 1998).

Pholcids spin messy, loose and irregular webs, and the males and females often hang inverted in the same webs. The females carry the spherical egg cluster under their chelicerae. When disturbed or under threat of attack, most pholcid species violently vibrate within their webs to scare off antagonists. Also sol-

itary species on firm ground can shake their bodies in such a rhythm that they virtually disappear from the human eye (Saaristo 2001). Many pholcid species are pantropical and synanthropic. They live in dark recesses, such as within houses and other buildings, in caves, under rocks and loose bark, as well as in leaf litter.

Previously, only three pholcid species belonging to two genera have been recorded from the Tibetan region of China (Hu 1985; Hu & Li 1987; Hu 2001): *Spermophora yadongensis* Hu 1985, *Pholcus everesti* Hu & Li 1987 and *Pholcus affinis* Schenkel 1953.

After examination of pholcid specimens collected from Tibet in 2002 and 2003, we here deal with seven species of this family belonging to three genera, including a new genus, *Tibetia*, and four new species: *Pholcus medog*, *P. zham*, *Belisana gyirong* and *B. mainling*. Also, two new combinations are proposed: *Belisana yadongensis* (Hu 1985) (transferred from *Spermophora*), *Tibetia everesti* (Hu & Li 1987) (transferred from *Pholcus*). Additionally, the common species, *Pholcus manueli* Gertsch 1937 (senior synonym of *Pholcus affinis* Schenkel 1953, by Senglet 2001) is listed.

METHODS

This paper is mostly based on material collected from Tibet by staff members from Hebei University, with the exception of *Pholcus manueli* Gertsch 1937. Terminology is standard for Araneae. Carapace length was mea-

sured from the anterior face of the ocular area to the rear margin of the carapace medially, excluding the clypeus. Total length is the sum of carapace and abdomen length, regardless of the petiole. The measurements of legs are presented as follows: total length (femur + patella plus tibia + metatarsus + tarsus). The left male pedipalp is used for illustrations. Epigyna were cleared in a warm solution of potassium hydroxide (KOH), transferred to water and temporarily mounted for drawing.

All measurements are given in millimeters. Type specimens are deposited in the College of Life Sciences, Hebei University (HU).

The following abbreviations are used: ALE = anterior lateral eyes; AME = anterior median eyes; PLE = posterior lateral eyes; PME = posterior median eyes; MOA = median ocular area; AME-ALE = distance between AME and ALE; ALE-PLE = distance between ALE and PLE; AME-AME = distance between AMEs; PME-PLE = distance between PME and PLE; PME-PME = distance between PMEs.

TAXONOMY

Family Pholcidae C.L. Koch 1851

Genus *Pholcus* Walckenaer 1805

Pholcus Walckenaer 1805: 80; Simon 1893: 470–471; Huber 2000: 77; Huber 2001: 108–111; Hu 2001: 81.

Type species.—*Aranea phalangioides* Fuesslin 1775, by subsequent designation.

Diagnosis.—Medium to large-sized pholcids with cylindrical opisthosoma, mostly with AMEs present. The most useful characters that distinguish *Pholcus* from other genera are the projections of the bulb, traditionally called the uncus, the appendix and the embolus. Other characters are the conservative male chelicerae (a pair of dark frontal apophyses and a pair of light lateral apophyses), the shape of the procurus (usually with ventral boss), and the knob or worm-shaped apophysis on the often roughly triangular or oval epigynum (Huber 2001).

Remarks.—The genus *Pholcus*, with more than 110 species mainly from the pan-Pacific region and Africa, is the largest pholcid genus. Most nominal species seem to be correctly placed, although they are poorly revised at the specific level. The real taxonomic problem is

its relationship to other genera of the *Pholcus* group (see Huber 2001).

Pholcus manueli Gertsch 1937

Pholcus manueli Gertsch 1937: 1, figs. 6–7; Senglet 2001: 62, figs. 60–66.

Pholcus affinis Schenkel 1953: 23, figs. 12a–b; Song et al. 1999: 52, figs. 11H, 22D–G; Hu 2001: 81, figs. 7.1–4 (first synonymized with *P. manueli* by Senglet in 2001).

Type material.—*Pholcus manueli*: the type specimens from New Jersey are deposited in the American Museum of Natural History, New York (not examined).

Pholcus affinis: 1 male paratype from Tcheuly of China is deposited in the Natural History Museum of Basel, Switzerland, examined by Senglet (2001); other type material unknown.

Material examined.—None from Tibet.

Description.—See Gertsch (1937) and Hu (2001).

Distribution.—China: Tibet (Gyirong), Hebei, Zhejiang, Jiangsu, Sichuan, Shannxi, Shanxi, Inner Mongolia, Liaoning, Jilin; Russia, Japan, U.S.A.

Remarks.—Judging from the figures drawn by Hu (2001), we are confident that this species is correctly identified and it is confirmed from Tibet.

Pholcus medog new species

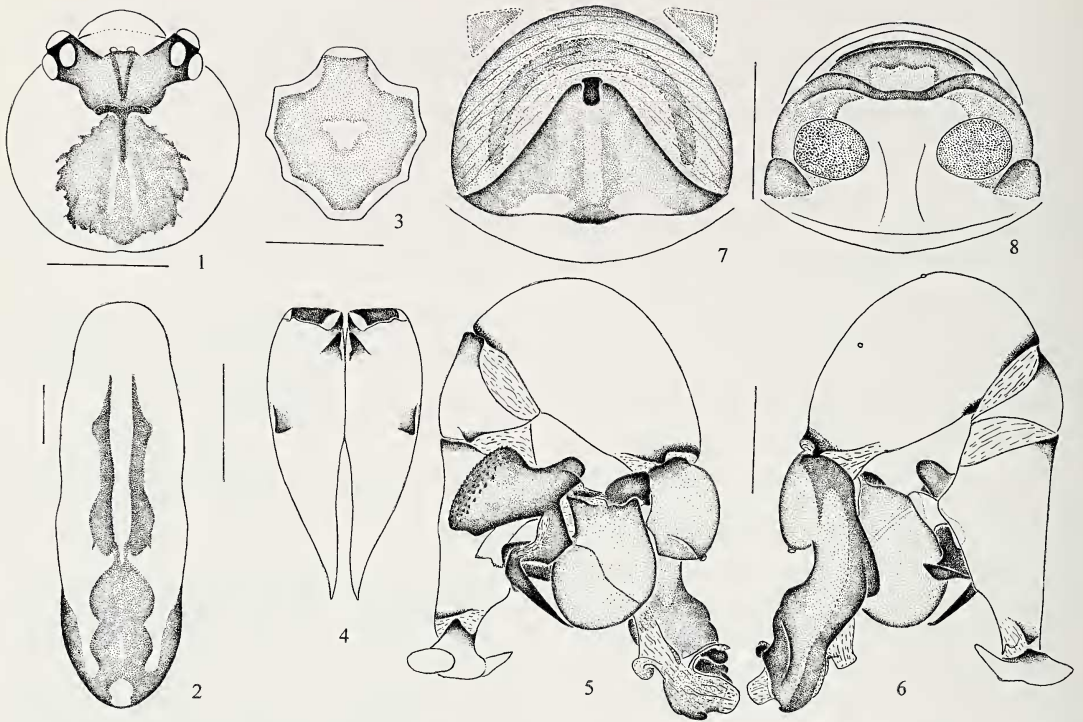
Figs. 1–8

Material examined.—CHINA: Tibet: Holotype male, Medog County (29°12'N, 95°18'E), 17 August 2003, Feng Zhang (HU). Paratypes: 5 females, 2 males, same data as holotype; 1 ♀, 1 ♂, Medog County, 10 August 2003, Feng Zhang (HU); 1 ♀, 3 juveniles, Baibung Town (29°12'N, 95°06'E), Medog County, 13 August 2003, Feng Zhang (HU).

Etymology.—The species name is a noun in apposition derived from the type locality.

Diagnosis.—This species resembles *P. podophthalmus* Simon 1893 (Song et al. 1999: 58, figs. 24O–V), but can be readily distinguished from the latter by the shape of uncus, the bifurcate appendix of the male pedipalp and the color pattern of the carapace.

Description.—*Male (holotype)*: Total body length 6.25; cephalothorax 1.17 long, 1.71 wide; abdomen 5.08 long, 1.40 wide. Prosoma shape as in Fig 1. Carapace short, broad and

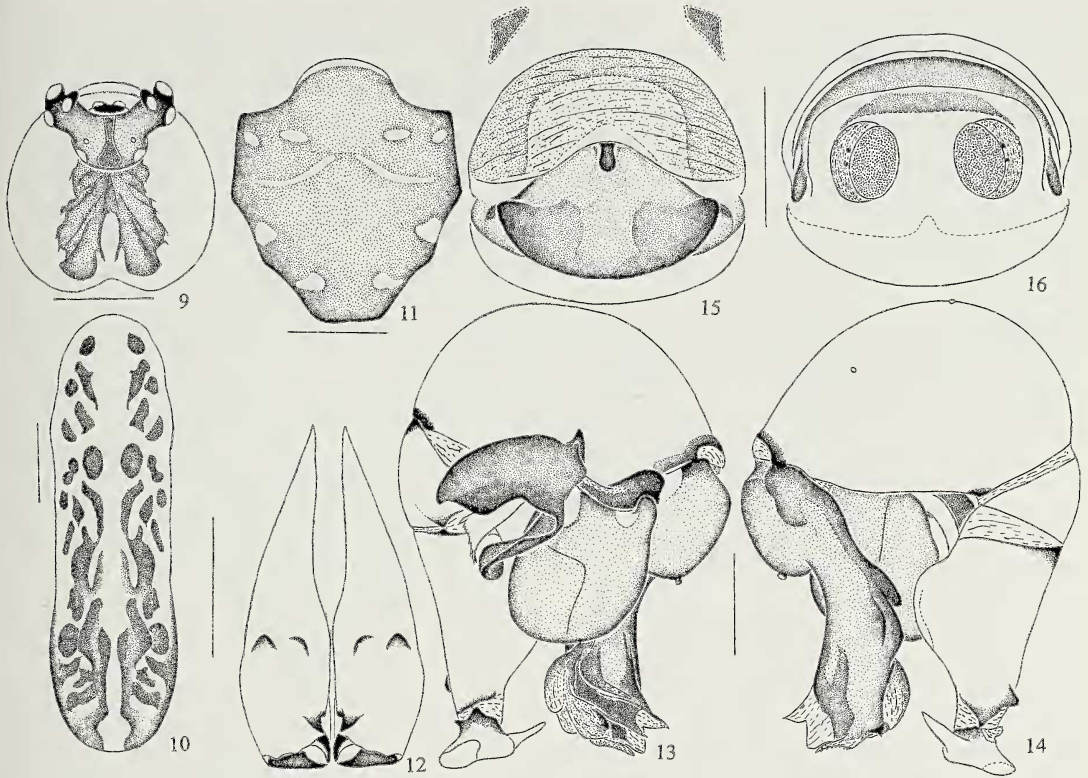


Figures 1-8.—*Pholcus medog*, new species: 1. male prosoma, dorsal view; 2. male opisthosoma, dorsal view; 3. male sternum, ventral view; 4. male chelicerae, frontal view; 5. left pedipalp, prolateral view. 6. same, retrolateral view; 7. epigynum, ventral view; 8. same, dorsal view. Scale lines: 1 mm (1-3), 0.5 mm (4-8).

almost circular, ochre, with brown mark broadly connecting to ocular area. Cephalic region raised, with two brown slender central marks, ocular area dark yellow. Clypeus 0.43 high, ochre, without marks. Except AMEs, other six eyes in two triads, each triad on the top of a relatively longer eye stalk. Distance AME-AME 0.05. Diameter AME 0.09, ALE 0.26, PME 0.18, PLE 0.23. Chelicerae shaped as in Fig. 4, with pair of black apophyses distally and pair of unsclerotized rounded apophyses proximolaterally. Labium light yellow. Endites gray. Sternum (Fig. 3) dark gray, with irregular yellow patches centrally. Legs exceedingly long and slender, femora, patellae and tibiae ochre, with dark rings, metatarsi and tarsi brown. Measurements of legs: I 52.51 (13.05 + 13.50 + 22.95 + 3.01); II 34.23 (9.00 + 9.21 + 14.4 + 1.62); III 23.47 (6.49 + 6.30 + 9.23 + 1.45); IV 32.11 (8.89 + 8.68 + 12.83 + 1.71). Leg formula: 1243. Abdomen cylindrical, pale ochre, dorsum with large brown pattern as in Fig. 2, venter with central long brown stripe. Spinnerets yellow-

ish brown. Uncus of male pedipalp large and slightly triangular, heavily sclerotized and provided with many teeth on the edge; appendix spilt into two parts; embolus lying between the uncus and appendix, soft and transparent (Fig. 5); procurus with ventral boss (Fig. 6).

Female: In general very similar to male. Total body length 4.86-6.23. One specimen measured: total length 5.95: cephalothorax 1.45 long, 1.53 wide; abdomen 4.50 long, 1.31 wide. Clypeus 0.55 high. Both eye rows recurved. Except AMEs, other six eyes in two triads, each triad on a slightly elevated tubercle. Distance AME-AME 0.05, AME-ALE 0.13, PME-PME 0.30, PME-PLE 0.04. Diameter AME 0.08, ALE 0.18, PME 0.15, PLE 0.17; MOA 0.26 long, front width 0.19, back width 0.56. Measurements of legs: I 40.81 (10.07 + 10.21 + 18.00 + 2.53); II 24.53 (6.75 + 6.03 + 10.13 + 1.62); III 17.58 (4.97 + 4.82 + 6.66 + 1.13); IV 24.08 (6.93 + 6.53 + 9.00 + 1.62). Leg formula: 1243. Epigynum roughly triangular, with a knob-shaped apophysis on the top of it (Fig. 7).



Figures 9–16.—*Pholcus zham*, new species: 9. male prosoma, dorsal view; 10. male opisthosoma, dorsal view; 11. male sternum, ventral view; 12. male chelicerae, frontal view; 13. left pedipalp, prolateral view; 14. same, retrolateral view; 15. epigynum, ventral view; 16. same, dorsal view. Scale lines: 1 mm (9, 10), 0.5 mm (11–16).

Habitat.—Untidy webs are made under cliff or rock crevices. Generally, a male and a female hang upside down in the same web.

Distribution.—Known from Medog County, Tibet.

Pholcus zham new species
Figs. 9–16

Material examined.—CHINA: *Tibet*: Holotype male, Zham Town (27°54'N, 85°54'E), Nyalam County, 30 August 2002, Feng Zhang and Zhi-Sheng Zhang (HU). Paratypes: 6 females, same data as holotype (HU).

Etymology.—The species name is a noun in apposition derived from the type locality.

Diagnosis.—This new species resembles *P. medog* (Figs. 1–8), but can be readily distinguished from the latter by: the shape of the uncus, the non-bifurcate appendix of male pedipalp and the chelicerae with two pairs of unsclerotized apophyses centrally.

Description.—*Male (holotype)*: Total body

length 6.33: cephalothorax 1.56 long, 1.73 wide; abdomen 4.77 long, 1.26 wide. Prosoma shape as in Fig. 9. Carapace short, broad and almost circular, ochre, with brown mark broadly connecting to ocular area. Cephalic region raised, with a brown longitudinal mark centrally, ocular area yellow. Clypeus 0.80 high, ochre, without marks. Except AMEs, other six eyes in two triads, each triad on the top of a relatively longer eye stalk. Distance AME-AME 0.07. Diameter AME 0.11, ALE 0.22, PME 0.16, PLE 0.17. Chelicerae shaped as in Fig. 12, with pair of black apophyses distally, and two pairs of unsclerotized rounded apophyses proximolaterally and proximo-centrally respectively. Labium light yellow. Endites gray. Sternum (Fig. 11) dark gray, with roughly 5 pairs of irregular yellow patches on it. Legs exceedingly long and slender, femora, patellae and tibiae ochre, with dark rings, metatarsi and tarsi brown. Measurements of legs: I 56.61 (13.77 + 13.95 + 25.65

+ 3.24); II 36.90 (9.76 + 10.04 + 14.85 + 2.25); III 24.57 (7.02 + 6.75 + 9.45 + 1.35); IV 32.91 (9.59 + 8.83 + 12.83 + 1.66). Leg formula: 1243. Abdomen cylindrical, pale ochre, dorsum with many brown spots as in Fig. 10, venter with central long brown stripe. Spinnerets yellowish brown. Uncus of male pedipalp large and slightly rectangular, heavily sclerotized and provided with many scales on the edge; sclerotized appendix hook-shaped and rod-like; embolus lying between the uncus and appendix, soft and transparent (Fig. 13); and procurus with ventral boss (Fig. 14).

Female: In general very similar to male. Total body length 7.36–8.82. One specimen measured: total length 8.82; cephalothorax 1.70 long, 1.72 wide; abdomen 4.32 long, 1.48 wide. Clypeus 0.49 high. Both eye rows recurved. Except AMEs, other six eyes in two triads, each triad on a slightly elevated tubercle. Distance AME-AME 0.06, AME-ALE 0.12, PME- PME 0.33, PME-PLE 0.08. Diameter AME 0.10, ALE 0.22, PME 0.14, PLE 0.21; MOA 0.31 long, front width 0.27, back width 0.58. Measurements of legs: I (12.96 + 13.95 + 25.61 + 3.19); II (9.45 + 9.54 + 14.37 + 2.21); III (6.75 + 6.44 + 9.00 + 1.26); IV (9.72 + 8.82 + 12.96 + 1.74). Leg formula: 1243. Epigynum roughly triangular, with a knob-shaped apophysis on the top of it (Fig. 15).

Habitat.—Untidy webs are made under rocks.

Distribution.—Known only from type locality in Nyalam County, Tibet.

Tibetia new genus

Type species.—*Pholcus everesti* Hu & Li 1987.

Etymology.—The generic name refers to Tibet, the Xizang Autonomous Region. The gender is feminine.

Diagnosis.—The genus *Tibetia* is similar to several other genera (*Wugigarra* Huber 2001, *Trichocyclus* Simon 1908, *Physocyclus* Simon 1893 and *Artema* Walckenaer 1837) through the possession of the peculiar set of structures on the procurus (dorsal apophysis and ventral pocket). It can be distinguished from *Wugigarra* by the absence of a characteristic worm-shaped process on the male bulb (Figs. 21–22) and the absence of stridulatory files in females, and the epigynum with a median de-

pression (Figs. 23, 51); from *Trichocyclus* by the absence of a weak zone dorsally on male cymbium (Fig. 56), and the median depression of the female epigynum; from *Physocyclus* by the bulbal apophysis and the shape of the procurus (Fig. 56), the absence of embolus on the bulb (only the sperm duct opening be seen) (Fig. 52) and the shape of the epigynum (Figs. 23, 51); and from *Artema* by the epigynal depression centrally (Fig. 23, 51), the absence of embolus and the shape of bulbal apophysis.

Additionally, the new genus also differs from the *Holocneminus* Berland 1942 (Berland 1942, figs. 5a–f), which is apparently widely distributed in eastern Asia, by the absence of stridulatory files in the female, and the normal tarsus of female pedipalp (not strongly dilated) (Fig. 52).

Description.—See description of single species below.

Remarks.—Judging from the known distribution of *Physocyclus*, it appears that *Physocyclus* is a New World genus, with the exception of the pantropical *Physocyclus globosus*, while the new genus is found only in Tibet. Thus the two genera appear to be allopatric in distribution.

Tibetia everesti (Hu & Li 1987) new combination

Figs. 17–24, 51–56

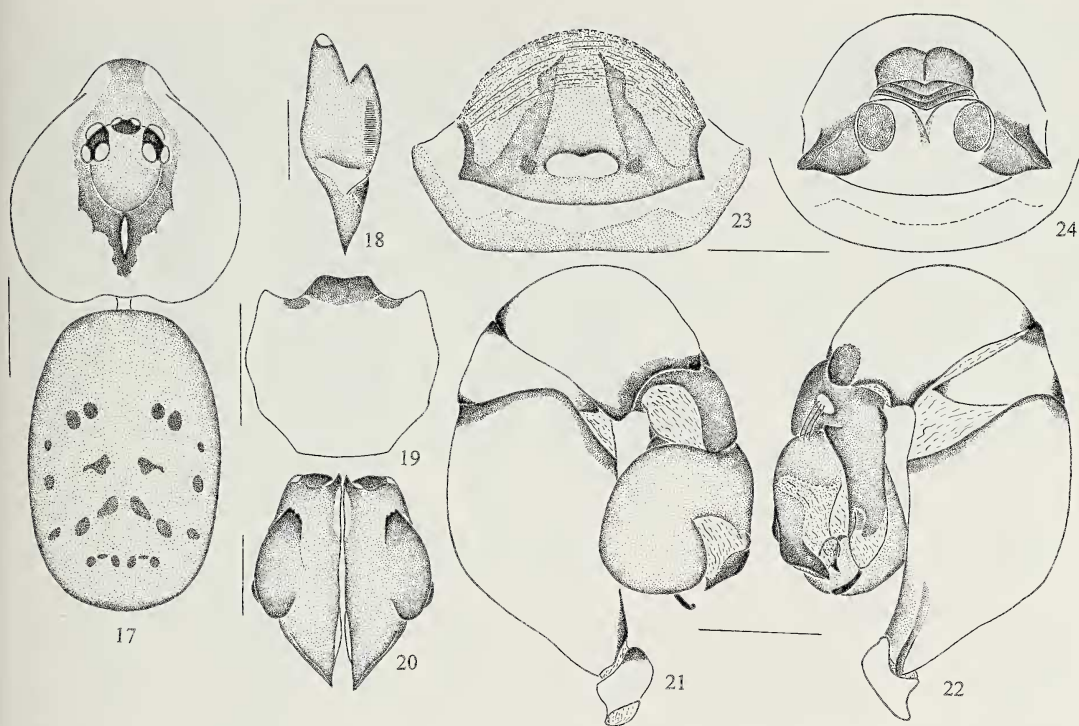
Pholcus everesti Hu & Li 1987: 260, fig. 8; Song, Zhu & Chen 1999: 57; Hu 2001: 82, fig. 8. 1–7.

Type material.—Hu & Li (1987) described both sexes from Nyingchi and Namling Counties, Tibet. The type specimens are deposited in Shandong University, China, not examined.

Material examined.—CHINA: *Tibet*: 5 ♀, 2 ♂, Zetang Town (29°12'N, 91°42'E), Nendong County, 25 August 2002, Ming-Sheng Zhu and Feng Zhang (HU); 1 ♀, 1 ♂, Rigaze City (29°12'N, 88°48'E), 6 September 2002, Jun-Xia Zhang (HU); 1 ♀, Nyingchi County (29°30'N, 94°18'E), 21 August 2003, Feng Zhang (HU); 1 ♀, 1 ♂, Bayi Town (29°36'N, 94°12'E), Nyingchi County, 2 August 2003, Ming-Sheng Zhu and Zhi-Sheng Zhang (HU); 1 ♀, Lhasa City (29°36'N, 91°06'E), 30 July 2002, Ming-Sheng Zhu and Jun-Xia Zhang (HU).

Diagnosis.—See generic diagnosis above.

Description.—*Male*: Total body length

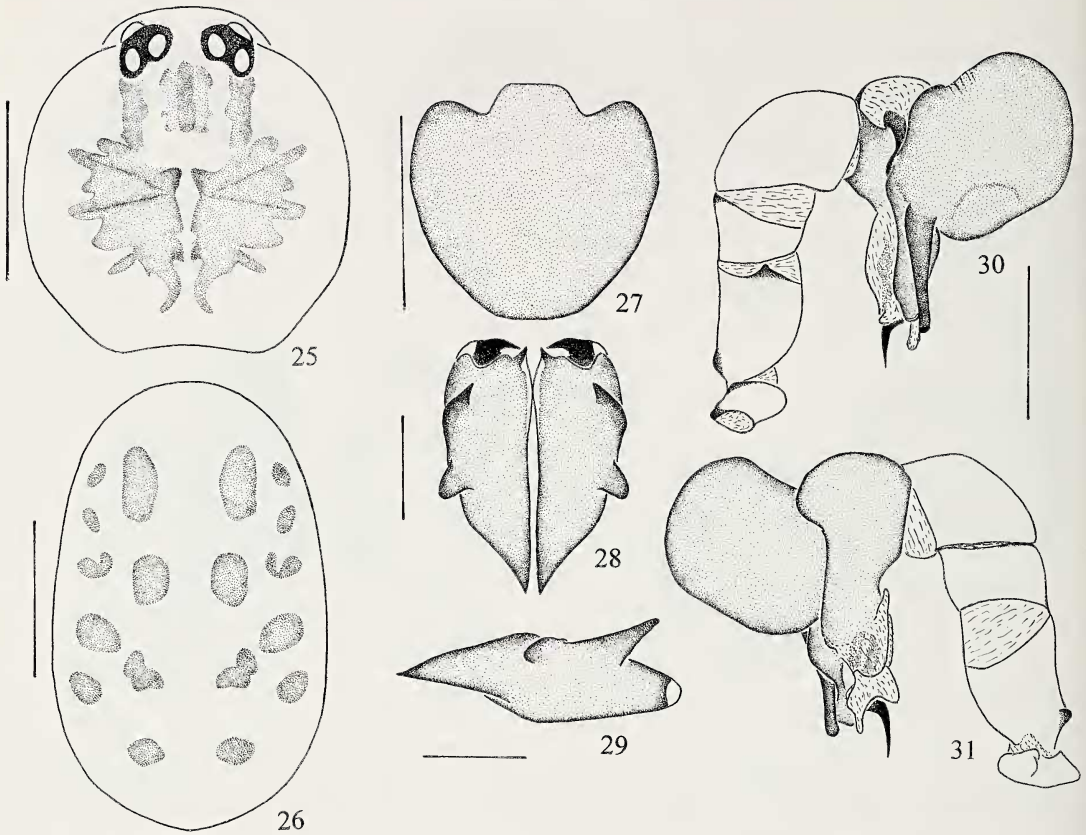


Figures 17–24.—*Tibetia everesti*, new species: 17. male, dorsal view; 18. male left chelicerae, retrolateral view; 19. male sternum, ventral view; 20. male chelicerae, frontal view; 21. left pedipalp, prolateral view; 22. same, retrolateral view; 23. epigynum, ventral view; 24. same, dorsal view. Scale lines: 0.5 mm (17, 19), 0.3 mm (21–24), 0.2 mm (18, 20).

1.63–2.24. One specimen measured: total length 2.24; cephalothorax 0.81 long, 1.15 wide; abdomen 1.43 long, 1.00 wide. Prosoma shape as in Fig 17. Carapace oval, wider than long, with distinct thoracic groove and brown mark centrally. Cephalic region slightly raised, ocular area light yellowish. Clypeus 0.30 high, unmodified, yellowish, with light brown marks. Except AMEs, other six eyes in two tracts, on a moderately elevated ocular area. Distance AME-AME 0.04, AME-ALE 0.04, PME-PME 0.13, PME-PL 0.03. Diameter AME 0.06, ALE 0.10, PME 0.13, PL 0.10. MOA 0.22 long, front width 0.16, back width 0.29. Chelicerae (Figs. 20–21) with stridulatory ridges and pair of large black apophyses proximolaterally. Labium gray. Endites pale. Sternum (Fig. 19) yellowish, without patches on it. Legs long, yellow, with dark rings subdistally on femur, patella plus tibia proximally, and tibia subdistally. Measurements of legs: I 11.15 (3.33 + 3.42 + 3.50 + 0.90); II 9.50 (2.75 + 2.97 + 3.06 + 0.72); III 8.70 (2.39 + 3.06 + 2.57 + 0.68); IV

10.31 (3.42 + 3.06 + 3.15 + 0.68). Leg formula: 1243. Abdomen globular, gray, with black spots dorsally. Spinnerets whitish yellow. Procursor (Fig. 22) relatively simple and with dorsal apophysis, ventral pocket indistinct; bulb (Fig. 21) consisting of the proximal globular part and the distal sclerotized apophysis, without embolus, but the sperm duct opening can be seen (Fig. 52).

Female: In general very similar to male. Total body length 1.88–2.34. One specimen measured: total length 2.34; cephalothorax 0.86 long, 1.04 wide; abdomen 1.50 long, 1.04 wide. Clypeus 0.33 high. Both eye rows recurved. Distance AME-AME 0.03, AME-ALE 0.03, PME-PME 0.14, PME-PL 0.02. Diameter AME 0.05, ALE 0.10, PME 0.10, PL 0.10. MOA 0.20 long, front width 0.13, back width 0.29. Measurements of legs: I lost; II 8.02 (2.52 + 2.45 + 2.46 + 0.59); III 6.85 (2.03 + 2.07 + 2.16 + 0.59); IV 8.97 (2.88 + 2.70 + 2.70 + 0.69). Epigynum roughly rectangular, with a depression centrally (Fig. 23).



Figures 25–31.—*Belisana gyirong*, new species: 25. male prosoma, dorsal view. 26. male opisthosoma, dorsal view. 27. male sternum, ventral view. 28. male chelicerae, frontal view. 29. male left chelicera, retrolateral view. 30. left pedipalp, prolateral view. 31. same, retrolateral view. Scale lines: 0.5 mm (25–27), 0.3 mm (30–31), 0.2 mm (28–29).

Distribution.—Known only from several localities in Tibet.

Belisana Thorell 1898

Belisana Thorell 1898: 278; Simon 1903: 988; Simon 1909: 81; Deeleman-Reinhold 1986: 46–47; Huber 2001: 124–126.

Type species.—*Belisana tauricornis* Thorell 1898, by original designation

Diagnosis.—Small-sized, pholcids with roughly globular or higher-than-long opisthosoma. Six eyes in two triads, AMEs absent, and eyes not elevated. Distance between PMEs less than two times diameter of PME. The genitalic structure is somewhat similar to that of *Spermophora* (Deeleman-Reinhold 1986), but can be distinguished from *Spermophora* by the distance between the PMEs which is less than two times the diameter of PME, but is more than three times the diameter of PME in *Spermophora*.

Remarks.—The distinction between *Belisana* and *Spermophorides* requires further clarification (see Huber 2001).

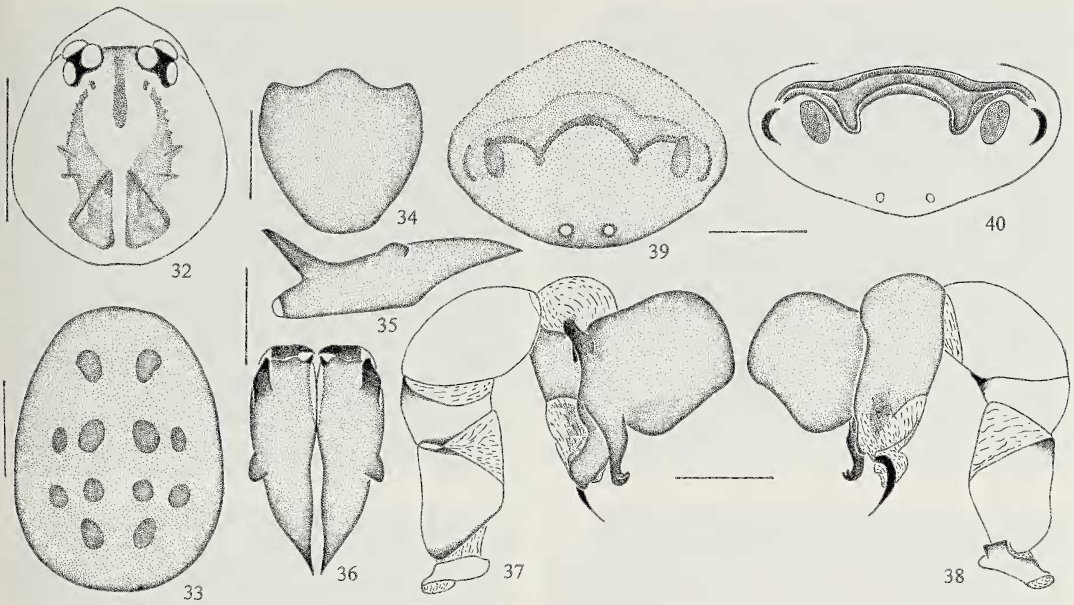
Belisana gyirong new species
Figs. 25–31

Material examined.—CHINA: *Tibet*: Holotype male, Gyirong Town (28°24'N, 85°12'E), Gyirong County (28°54'N, 85°12'E), 2 September 2002, Ming-Sheng Zhu and Jun-Xia Zhang (HU). Paratype: 1 male, same data as holotype (HU).

Etymology.—The species name is a noun in apposition derived from the type locality.

Diagnosis.—This new species resembles *B. yadongensis* (Hu 1985), but can be readily distinguished from the latter by the long apophysis of the bulb and the subdistal apophyses of chelicerae bending internally.

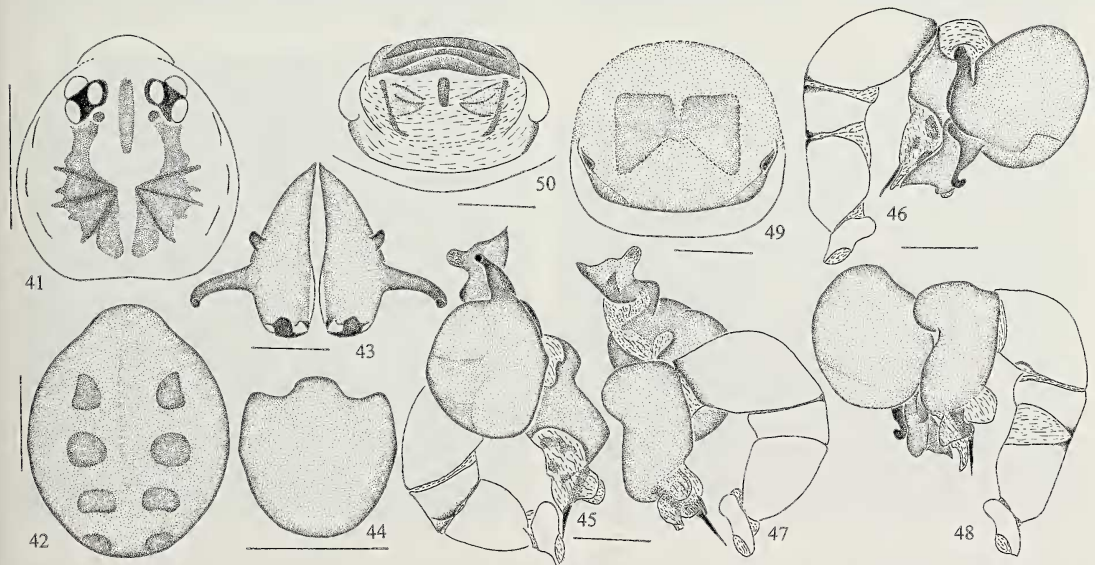
Description.—*Male (holotype)*: Total length of body 2.23; cephalothorax 0.86 long,



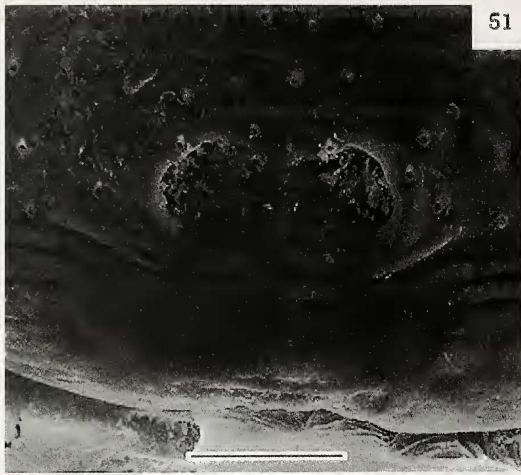
Figures 32–40.—*Belisana mainling*, new species: 32. male prosoma, dorsal view; 33. male opisthosoma, dorsal view; 34. male sternum, ventral view; 35. male left chelicera, retrolateral view; 36. male chelicerae, frontal view; 37. left pedipalp, prolateral view; 38. same, retrolateral view; 39. epigynum, ventral view; 40. same, dorsal view. Scale lines: 0.5 mm (32–33), 0.3 mm (34), 0.2 mm (35–40).

0.91 wide; abdomen 1.37 long, 0.87 wide. Prosoma shape as in Fig. 25. Carapace oval, slightly longer than wide, without thoracic groove, with brown mark on each side of car-

apace. Cephalic region not raised. Ocular area light yellowish, with an ochre mark centrally. Clypeus 0.22 high, unmodified, without marks. Six eyes in two triads. Distance PME-



Figures 41–50.—*Belisana yadongensis*: 41. male prosoma, dorsal view; 42. male opisthosoma, dorsal view; 43. male chelicerae, frontal view; 44. male sternum, ventral view; 45, 46. left pedipalp, prolateral view; 47, 48. same, retrolateral view; 49. epigynum, ventral view; 50. same, dorsal view. Scale lines: 0.5 mm (41–42, 44), 0.2 mm (43, 45–50).



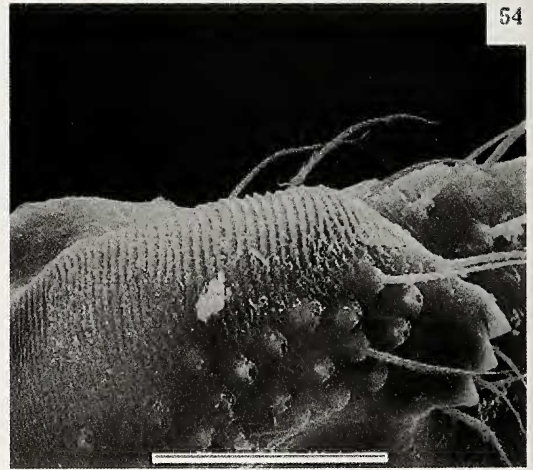
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52



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Figures 51–56.—*Tibetia everesti*, new species: 51. epigynum, ventral view, showing copulatory opening; 52. tip of female pedipalp; 53. male right palpal organ, showing sperm duct opening; 54. male right chelicera, showing the end of black apophysis proximolaterally; 55. male right chelicera, showing stridulatory ridges; 56. male right pedipalp, showing shape of the procurus.

PME 0.09. Diameter ALE 0.09, PME 0.09, PLE 0.09. Chelicerae (Figs. 28–29) with pair of simple, black and long apophyses subdistally and pair of rounded light apophyses proximolaterally. Labium and endites whitish. Sternum yellowish, without patches on it. Measurements of legs: I 19.06 (5.22 + 5.72 + 5.89 + 2.23); II 13.66 (3.38 + 4.05 + 4.95 + 1.28); III 9.18 (2.70 + 2.61 + 3.15 + 0.72); IV 11.21 (3.33 + 3.15 + 3.83 + 0.90). Leg formula: 1243. Abdomen (Fig. 26) almost globular, whitish with black spots dorsally. Bulb consisting of proximal globular part and distal sclerotized apophysis (Fig. 30).

Female: Unknown.

Distribution.—Known only from the type locality in Tibet.

Belisana mainling new species

Figs. 32–40

Material examined.—CHINA: *Tibet*: Holotype male, Mainling County (29°12'N, 94°06'E), 19 August 2002, Ming-Sheng Zhu and Jun-Xia Zhang (HU). Paratypes: 2 females, same data as holotype (HU).

Etymology.—The species name is a noun in apposition derived from the type locality.

Diagnosis.—This new species resembles *B. yadongensis* (Hu 1985), but can be readily distinguished from the latter by the tip of the bulbal apophysis with two pointed apiculi, the internal structure of epigynum, and the apophyses subdistally of chelicerae bending internally.

Description.—*Male (holotype)*: Total length of body 2.18: cephalothorax 0.73 long, 0.78 wide; abdomen 1.45 long, 1.05 wide. Prosoma shape as in Fig. 32. Carapace oval, wider than long, without thoracic groove, with brown mark on each side of carapace. Cephalic region not raised. Ocular area light yellowish, with a ochre bar centrally. Clypeus 0.23 high, unmodified, without marks. Six eyes in two triads. Distance PME-PME 0.10. Diameter ALE 0.09, PME 0.08, PLE 0.08. Chelicerae (Figs. 35–36) with pair of simple black long apophyses subdistally and pair of rounded light apophyses proximolaterally. Labium and endites whitish. Sternum (Fig. 34) yellowish, without patches on it. Measurements of legs: I 10.13 (2.56 + 2.83 + 3.51 + 1.23); II 7.45 (2.03 + 2.18 + 2.49 + 0.75); III 5.89 (1.57 + 1.93 + 1.71 + 0.68); IV 6.63 (1.87 + 1.92 + 2.16 + 0.68). Leg formula:

1243. Abdomen (Fig. 33) almost globular, white with black spots dorsally. Bulb consisting of the proximal globular part and the distal sclerotized apophysis (Fig. 37).

Female: In general very similar to male. Total body length 1.58–1.66. One specimen measured: total length 1.66: cephalothorax 0.67 long, 0.70 wide; abdomen 0.99 long, 0.58 wide. Clypeus 0.19 high. Distance PME-PME 0.08. Diameter ALE 0.08, PME 0.08, PLE 0.08. Measurements of legs: I 8.07 (2.23 + 2.38 + 2.45 + 1.01); II 5.90 (1.79 + 1.76 + 1.69 + 0.66); III 4.04 (1.16 + 1.14 + 1.19 + 0.55); IV 5.35 (1.73 + 1.53 + 1.48 + 0.61). Leg formula: 1243. Epigynum roughly oval (Fig. 39).

Distribution.—Known only from the type locality in Tibet.

Belisana yadongensis (Hu 1985) new

combination

Figs. 41–50

Spermophora yadongensis Hu 1985: 148, figs. 1–10; Song et al. 1999: 65; Hu 2001: 85, figs. 10.1–10.

Type material.—Hu (1985) described both sexes from Yadong County, Tibet. The type specimens are deposited in Shandong University, China, not examined.

Material examined.—CHINA: *Tibet*: 19 ♀, 11 ♂, Yadong County (27°24'N, 88°54'E), 3 September 2002, under stone heap, Feng Zhang and Zhi-Sheng Zhang (HU); 2 ♀, 1 ♂, Xiayadong Town, Yadong County, 4 September 2002, Feng Zhang and Zhi-Sheng Zhang (HU).

Description.—*Male*: Total body length 1.39–1.71. One specimen measured: total body length 1.71: cephalothorax 0.70 long, 0.67 wide; abdomen 1.01 long, 0.78 wide. Prosoma shape as in Fig. 41. Carapace oval, slightly longer than wide, without thoracic groove, with brown mark on each side of carapace. Cephalic region not raised. Ocular area light yellowish, with an ochre bar centrally. Clypeus 0.18 high, unmodified, without marks. Six eyes in two triads. Distance PME-PME 0.12. Diameter ALE 0.08, PME 0.06, PLE 0.07. Chelicerae shaped as in Fig. 43, with pair of simple large black apophyses subdistally and pair of rounded light apophyses proximolaterally. Labium and endites whitish. Sternum yellowish, without patches on it. Legs light ochre, without dark ring and spine.

Measurements of legs: I 9.91 (2.48 + 2.80 + 3.42 + 1.21); II 7.16 (1.94 + 2.16 + 2.34 + 0.72); III 5.66 (1.52 + 1.89 + 1.67 + 0.58); IV 6.36 (1.80 + 1.87 + 2.07 + 0.62). Leg formula: 1243. Abdomen almost globular, whitish with black spots dorsally. Bulb consisting of the proximal globular part and the distal sclerotized apophysis.

Female: In general very similar to male. Total body length 1.63–1.88. One specimen measured: total body length 1.84; cephalothorax 0.67 long, 0.67 wide; abdomen 1.17 long, 0.92 wide. Clypeus 0.17 high. Distance PME-PME 0.13. Diameter ALE 0.08, PME 0.08, PLE 0.06; Measurements of legs: I 7.84 (2.12 + 2.25 + 2.48 + 0.99); II 5.66 (1.63 + 1.65 + 1.70 + 0.68); III 4.37 (1.30 + 1.28 + 1.31 + 0.48); IV 5.59 (1.70 + 1.62 + 1.62 + 0.65). Leg formula: 1243. Epigynum roughly rectangular.

Distribution.—Only found in Yadong County, Tibet.

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LITERATURE CITED

- Deeleman-Reinhold, C.L. 1986. Studies on tropical Pholcidae II. Redescription of *Micromerys gracilis* Bradley and *Calapnita vermiformis* Simon (Araneae, Pholcidae) and description of some related new species. *Memoirs of the Queensland Museum* 22:205–224.
- Gertsch, W.J. 1937. New American spiders. *American Museum Novitates* 936:1–7.
- Hu, J.L. 1985. A new species of spider of the genus *Spermophora* from Xizang Autonomous Region, China (Araneae: Pholcidae). *Acta Zootaxonomica Sinica* 10:148–151.
- Hu, J.L. 2001. Spiders in Qinghai-Tibet Plateau of China. Henan Science and Technology Publishing House, 658 pp.
- Hu, J.L. & A.H. Li. 1987. The spiders collected from the fields and the forests of Xizang Autonomous Region, China. II. Agricultural Insects, Spiders, Plant Diseases and Weeds of Xizang 2: 247–353.
- Huber, B.A. 1995. Copulatory mechanism in *Holcnemus pluchei* and *Pholcus opilionoides*, with notes on male cheliceral apophyses and stridulatory organs in Pholcidae (Araneae). *Acta Zoológica, Stockholm* 76:291–300.
- Huber, B.A. 1998. On the “valve” in the genitalia of female pholcids (Pholcidae, Araneae). *Bulletin of the British Arachnological Society* 11:41–48.
- Huber, B.A. 1999. Sexual selection in pholcid spiders (Araneae, Pholcidae): artful chelicerae and forceful genitalia. *Journal of Arachnology* 27: 135–141.
- Huber, B.A. 2000. New World pholcid spiders (Araneae: Pholcidae): a revision at generic level. *Bulletin of the American Museum of Natural History* 254:1–348.
- Huber, B.A. 2001. The pholcids of Australia (Araneae; Pholcidae): taxonomy, biogeography, and relationships. *Bulletin of the American Museum of Natural History* 260:1–144.
- Koch, C.L. 1851. *Übersicht des Arachnidensystems*. Vol. 5. J.L. Lotzbeck, Nürnberg.
- Platnick, N.I. 2004. The world spider catalog, version 5.0. American Museum of Natural History, online at <http://research.amnh.org/entomology/spiders/catalog/index.html>
- Saaristo, M.I. 2001. Pholcid spiders of the granitic Seychelles (Araneae, Pholcidae). *Phelsuma* 9:9–28.
- Schenkel, E. 1953. Chinesische Arachnoidea aus dem Museum Hoangho-Peiho in Tientsin. *Boletim do Museu Nacional, Rio de Janeiro* 119:1–108.
- Senglet, A. 2001. Copulatory mechanisms in *Hoplopholcus*, *Stygopholcus* (revalidated), *Pholcus*, *Spermophora* and *Spermophorides* (Araneae, Pholcidae), with additional faunistic and taxonomic data. *Mitteilungen Der Schweizerischen Entomologischen Gesellschaft* 74:43–67.
- Simon, E. 1893. *Histoire Naturelle des Araignées*. 2^e edition, 1(2):256–488. Librairie Encyclopédique de Roret, Paris.
- Simon, E. 1903. *Histoire Naturelle des Araignées*. 2^e edition, 2(4):669–1080. Librairie Encyclopédique de Roret, Paris.
- Simon, E. 1909. *Étude sur les Arachnides du Tonkin* (1^{ère} partie). *Bulletin Scientifique de la France et de la Belgique* 42:69–147.
- Song, D.X., M.S. Zhu & J. Chen. 1999. The Spiders of China. Hebei Science and Technology Publishing House, Shijiazhuang.
- Thorell, T. 1898. Secondo saggio sui ragni Birmani. II. Retitelariae et Orbitelariae. *Annali del Museo Civico di Storia Naturale di Genova* 39:271–378.
- Uhl, G., Huber, B.A. & Rose, W. 1995. Male pedipalp morphology and copulatory mechanism in

- Pholcus phalangioides* (Fuesslin, 1775) (Araneae, Pholcidae). Bulletin of the British Arachnological Society 10:1–9.
- Walckenaer, C.A. 1805. Tableau des aranéides ou caractères essentiels des tribus, genres, familles et races que renferme le genre Aranea de Linné, avec la désignation des espèces comprises dans chacune de ces divisions. Paris.
- Manuscript received 19 March 2004, revised 2 March 2005.*